Java Programming

Classes

Inheritance

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CONSTRUCTOR METHODS

- Consider the following class definition:

```
class Account {
    private String acctNo;
    private boolean active;
    private String owner;

    public void displayInfo( ) {
        System.out.println("Acct number: "+acctNo);
        System.out.println("Owner: "+owner);
        System.out.print("Status: ");
        if (!active)
            System.out.print("NOT ");
        System.out.println("ACTIVE");
    }
}
```

CONSTRUCTOR METHODS

- What happen when the following statements are executed?

```
Account acct = new Account( );
acct.displayInfo( );
```

- When an object is created, its attributes should be initialized. Example:

```
Account acct = new Account( );
acct.initialize("010-99333-03", "Nada Asyiqin",
                true);
acct.displayInfo( );
```

Problem: It is easy to forget to do the initialization.

CONSTRUCTOR METHODS

- Can object initialization be done during object creation?
- Two common ways of initializing attributes during object creation:
  - Using instance variable initializers
  - Using constructor methods

CONSTRUCTOR METHODS

Method 1: Instance Variable Initializer

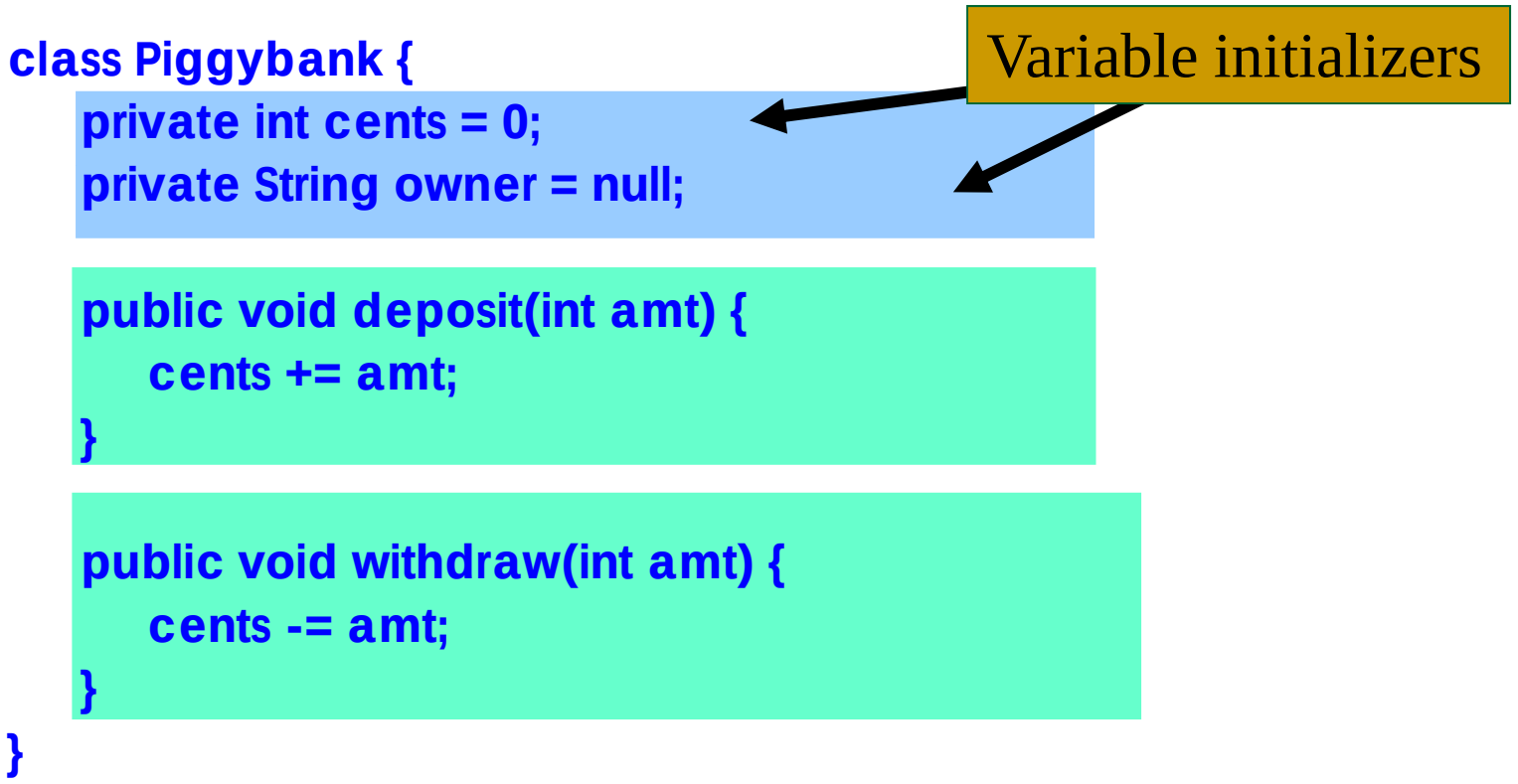
```
class Piggybank {
    private int cents = 0;
    private String owner = null;

    public void deposit(int amt) {
        cents += amt;
    }

    public void withdraw(int amt) {
        cents -= amt;
    }
}
```

CONSTRUCTOR METHODS

Method 1: Instance Variable Initializer



CONSTRUCTOR METHODS

- For each *Piggybank* object created, its instance variable *cents* will be initialized to 0.

```
for (int i=0; i < 3; i++)
    new Piggybank( );
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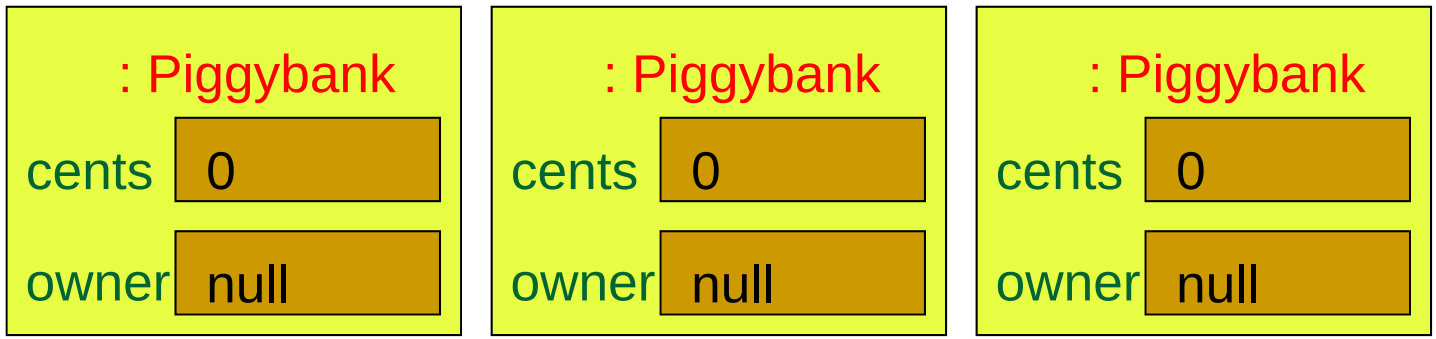

CONSTRUCTOR METHODS

Method 2: Constructor Methods

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class Piggybank {
    private int cents;
    private String owner;

    public Piggybank( ) {
        cents = 0;
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CONSTRUCTOR METHODS

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        cents -= amt;
    }
}
```

Constructor method

CONSTRUCTOR METHODS

- The constructor method is executed each time a Piggybank object is created. When executed,
  - the *cents* attribute of the created object is initialized to 0.
  - the *owner* attribute is set to *null*.

CONSTRUCTOR METHODS

- Now consider the following code:

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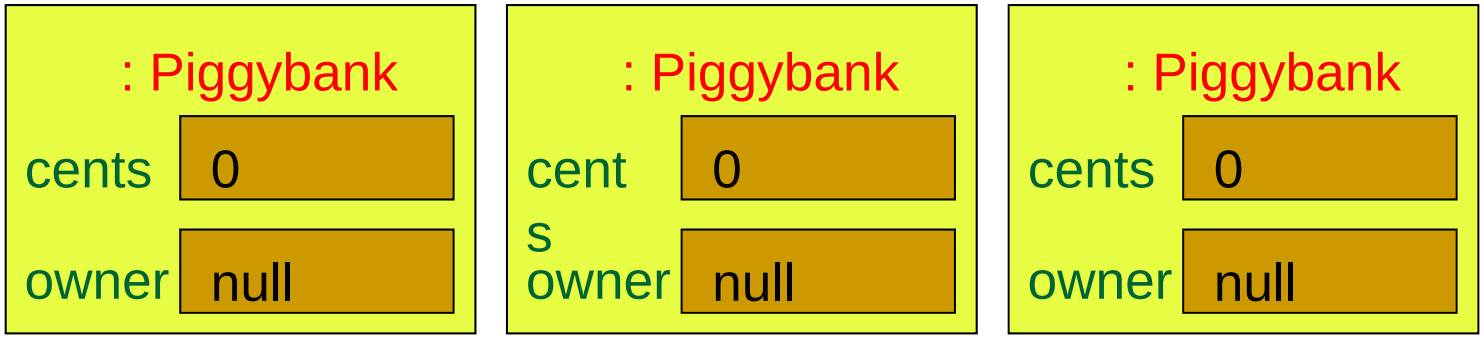

CONSTRUCTOR METHODS

- The constructor method is a suitable place for putting in the necessary code for initializing an object when it is being created.
- Constructors are not allowed to return any value at the end of their execution.

  In fact, constructors do not have a return type.

CONSTRUCTOR METHODS

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public Piggybank( ) {
    cents = 0;
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}
```

CONSTRUCTOR METHODS

- Another restriction: the name of a constructor must be the same as the name of the class.

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class Piggybank {
    ...
    public Piggybank( )
    {
        cents = 0;
        owner = null;
    }
}
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CONSTRUCTOR METHODS

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```
class Piggybank {

    public Piggybank( )
    {
        cents = 0;
        owner = null;
    }
}
```

CONSTRUCTOR METHODS

- Constructors can be parameterized. For an object to execute a constructor with parameters, the required parameters need to be passed when that object is created.

CONSTRUCTOR METHODS

```
class Piggybank {
    private int cents;
    private String owner;

    public Piggybank(int amt, String name) {
        cents = amt;
        owner = name;
    }
    public void deposit(int amt) {
        cents += amt;
    }
    public void withdraw(int amt) {
        cents -= amt;
    }
}
```

CONSTRUCTOR METHODS

- An example of creating a Piggybank object:

```
Piggybank pb = new
                Piggybank(100,“Raziq”);
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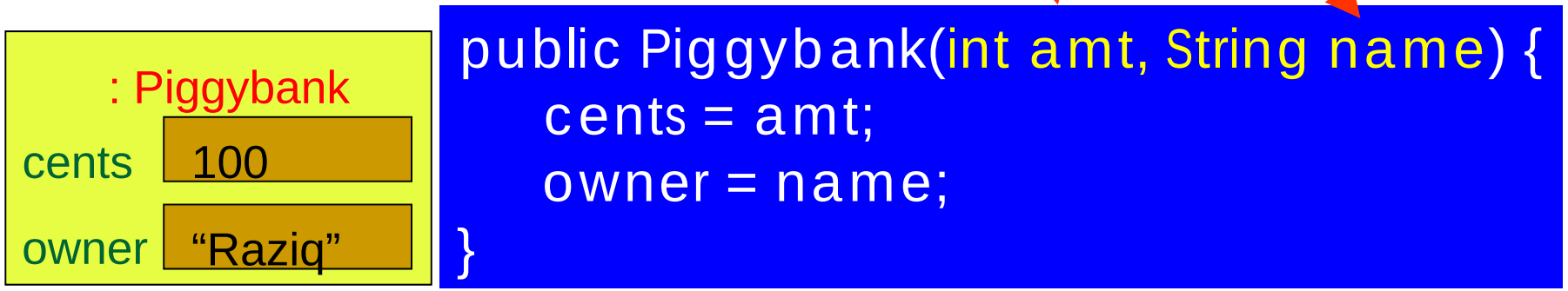


CONSTRUCTOR METHODS

- Each class must define at least one constructor method.
- If no constructors are defined for a class, the Java compiler will automatically insert a default constructor.
- The default constructor inserted will contain no parameter and has an empty body.

CONSTRUCTOR METHODS

```
class Account {
   private String acctNo;
   private boolean active;
   private String owner;
   public Account(String nbr, String name) {
        acctNo = nbr;
        owner = name;
        active = false;
   }
   public void displayInfo( ) {
        System.out.println(“Account number: "+acctNo);
        System.out.println(“Owner: "+owner);
        System.out.print("Status: ");
        if (!active)
           System.out.print(“NOT ");
        System.out.println("ACTIVE");
   }
}
```

CONSTRUCTOR METHODS

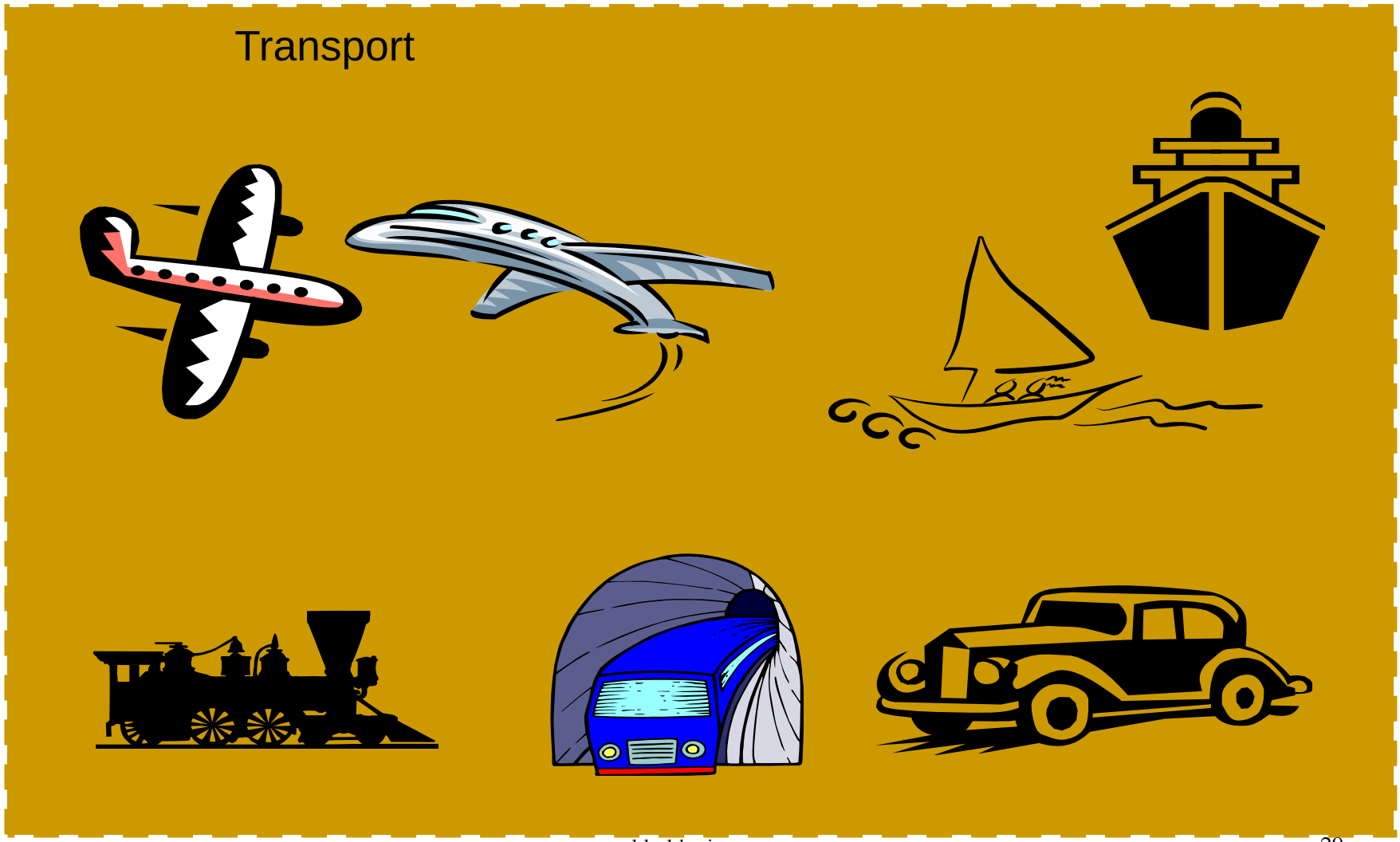
```
class Application {
    public static void main(String[ ] args) {
        Account acct;
        acct = new Account("010-99333-    03", "Nada Asyiqin");
        acct.displayInfo( );
    }
}
```

Inheritance

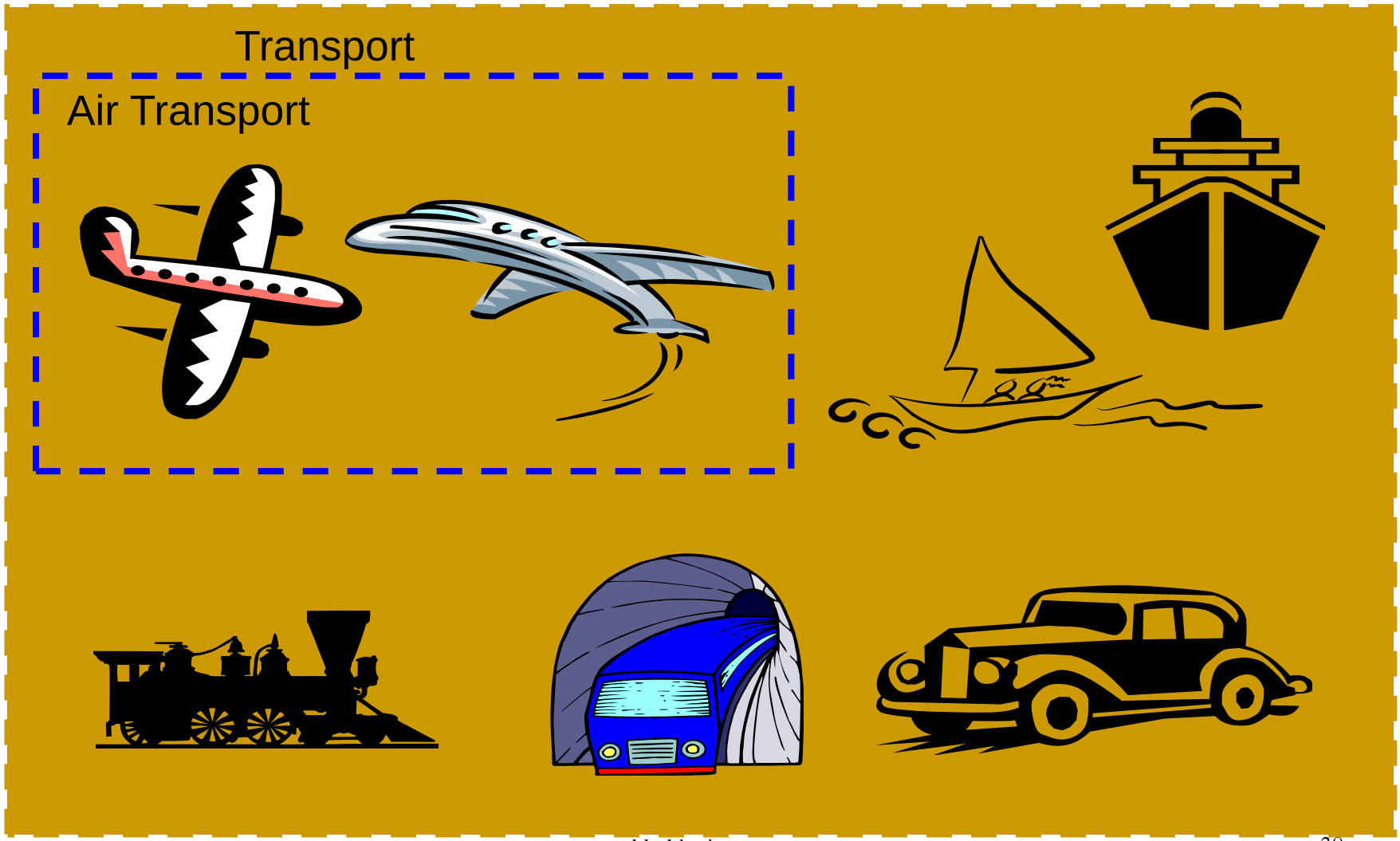
Inheritance Relationship

- The inheritance relationship can be viewed as a relationship between an object category and its subcategories.
  - For example...

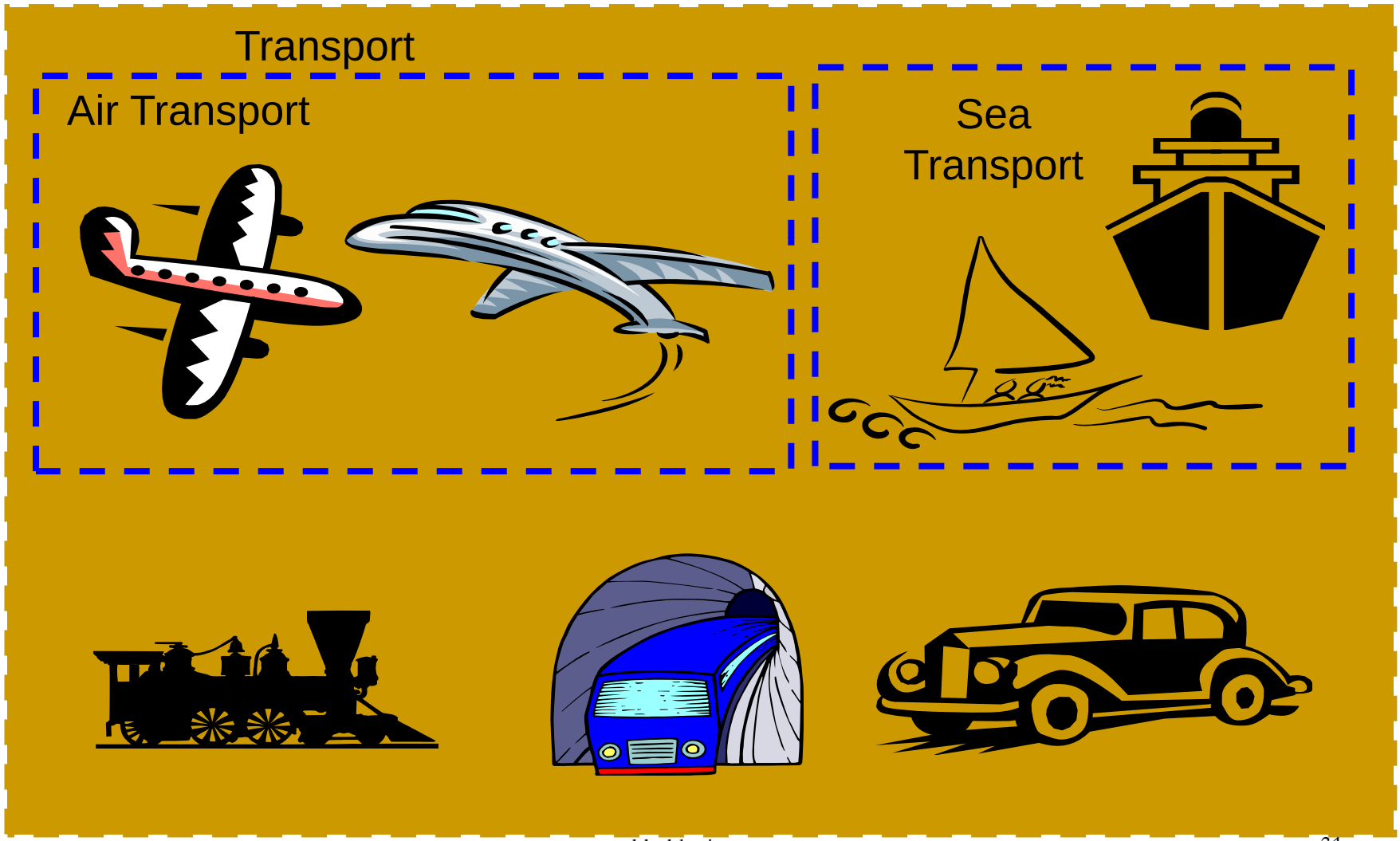
Inheritance Relationship



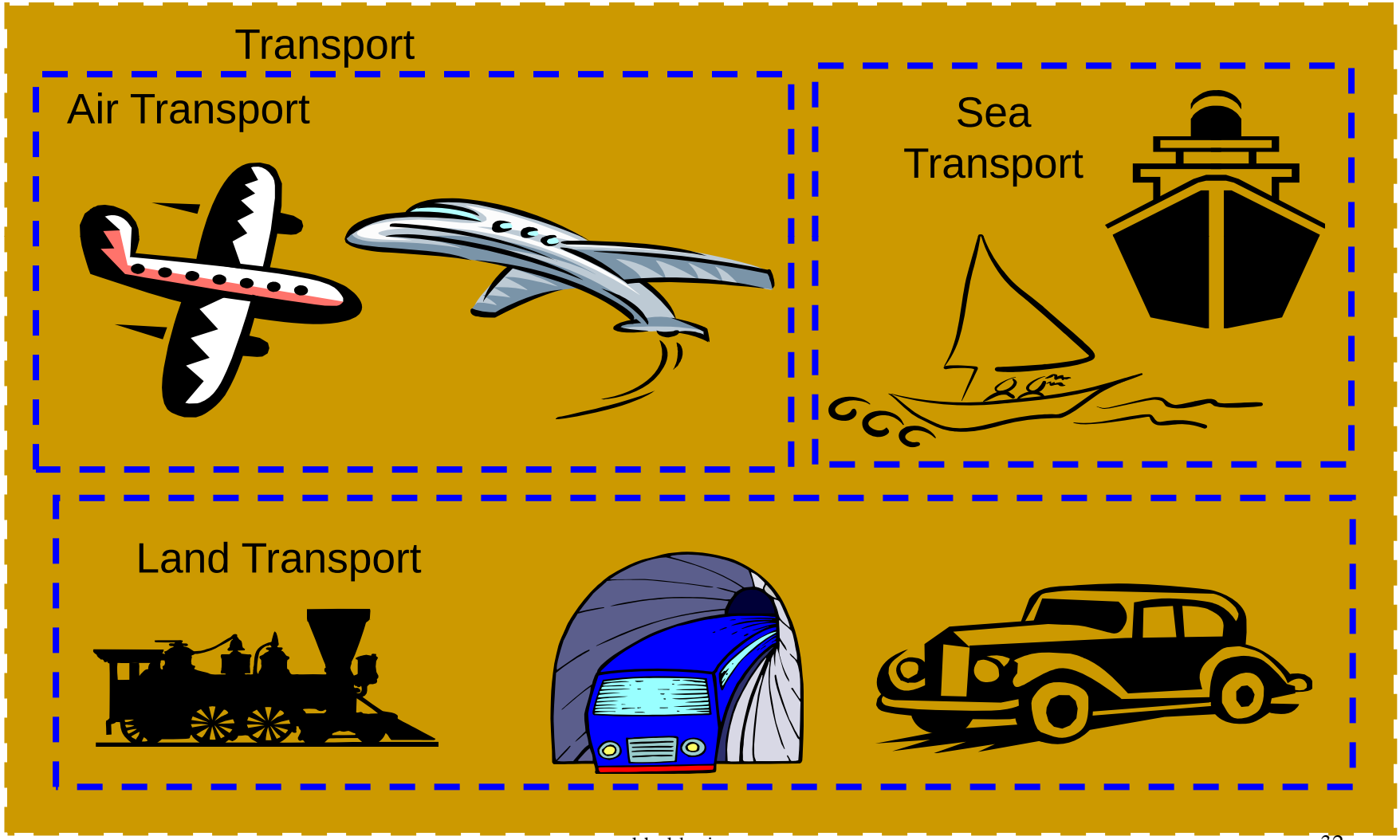
Inheritance Relationship



Inheritance Relationship



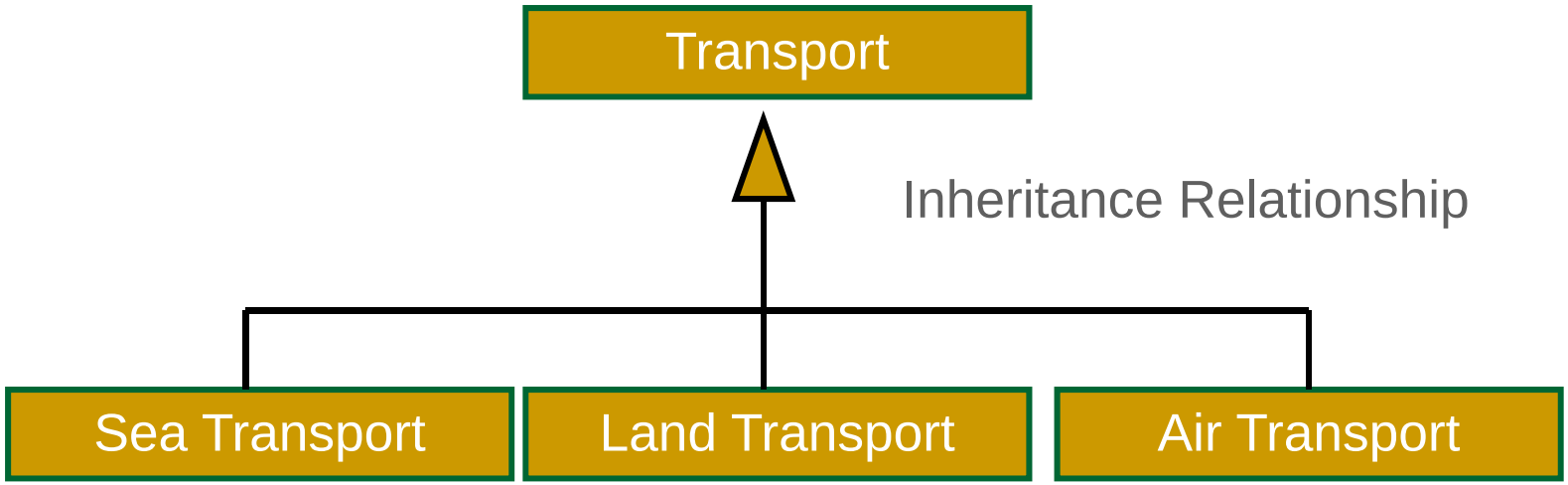
Inheritance Relationship

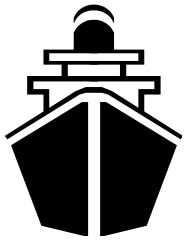


Inheritance Relationship

- The inheritance relationship is sometimes called the “is-a” relationship.
  - For example...

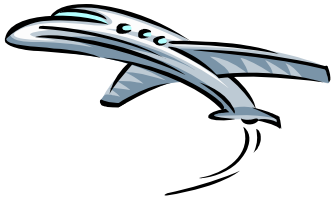
Inheritance Relationship





Sea Transport object "is a" Transport object

Land Transport object "is a" Transport object



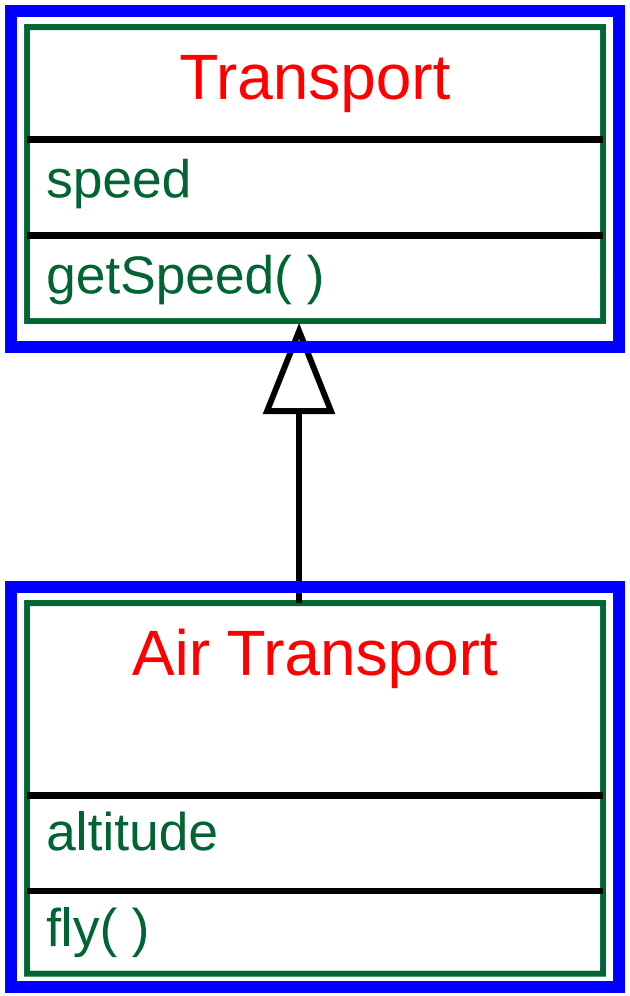
Air Transport object "is a" Transport object

Inheritance Relationship

- Based on the meaning of the “is-a” relationship, each object will have attributes and behaviour as defined by its category and all its supercategories.

- An inheritance hierarchy can be built through generalization or specialization.

Inheritance Relationship



Attributes

speed

altitude

Behaviour

getSpeed()

fly()

Questions

THANK YOU

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Feb, 2010

THE END